



**Request for Proposal (RFP)**

**Design, Development and Maintenance of Bengaluru Transport Stack**

**announced by JICA DXLab**

RFP Release Date: 1 May 2025



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## Introduction

**Japan International Cooperation Agency** (“JICA”) is a governmental agency that coordinates official development assistance (“ODA”) for the Government of Japan to promote socio-economic growth in partner countries. JICA supports sustainable development in partner countries including JICA through finance, technical cooperation and grant. In India, JICA has been a long-standing development partner for metro network development including for the city of Bengaluru.

**JICA DXLab** is a mechanism within JICA that spearheads the digital transformation initiative based on its portfolio projects and programs to achieve greater socioeconomic impact. JICA DXLab particularly focuses on the development and adoption of digital public infrastructure (“DPI”) and artificial intelligence (“AI”), aiming to leverage data and digital solutions. JICA DXLab has been leading the development of Delhi Transport Stack, a novel DPI that is equipped with data interoperability framework and a data exchange platform at its core and provides access to key transport data and ancillary services to enable multiple value propositions for citizens, transport operators, governments, and business/entrepreneurs, fostering better multimodal mobility and data-driven innovation ecosystem.

Based on the ongoing success in Delhi Transport Stack, JICA DXLab now envisions to develop and drive **Bengaluru Transport Stack** with key transport sector stakeholders in Bengaluru, and an aspirational digital partner that will be selected through this RFP.



## 1. RFP Process & Guidelines

### 1.1. Milestones & Timelines

#### (1) Timeline for the Selection

Milestones	Tentative timeline	Remarks
RFP release	1 May 2025	
Pre-bid query meeting with prospective bidders	5 May 2025	Will be conducted online. Confirmation of participation via email on <a href="mailto:JICADxLabTransportStack@bcg.com">JICADxLabTransportStack@bcg.com</a> , is mandatory to receive the online link for the session.
Submission of queries	6 May 2025	
Submission of technical & commercial proposals	10 May 2025	
Qualified (eligible) potential bidders' technical presentations	12 May 2025	Will be conducted through online mode
Contract award – issuance of letter of award	15 May 2025	

#### (2) Contract Duration

- The total duration of the contract will be 11 months from May 2025 to March 2026.
- The initial contract period (“Initial Term”) between JICA and a selected bidder (“Digital Partner”) for the development of Transport stack Cloud Platform and the Web Portal cum Marketplace, and the implementation of initial set of use cases described in the Section 3 will be from May 2025 to the end of July 2025.
- For the subsequent contract period (“Subsequent Term”), which includes the remaining 8 months until the end of March 2026 for further development and post-development hypercare support of the Transport Stack Cloud Platform and the Web Portal cum Marketplace, and more use case implementation, the contract will be extended if the Initial Term is successfully completed.

#### Note:

- While the total contract duration for developing and maintenance of the Transport Stack is 11 months, this timeline may be revised in the event of unforeseen circumstances, subject to mutual agreement with JICA.
- In the event of delays attributable to the Digital Partner, any additional costs or time extensions incurred shall be borne by the Digital Partner.
- If the solution achieves its desired objectives, JICA may explore options to scale or expand the platform’s scope—encompassing broader geographic regions, new data sources, or additional functionalities.

#### (3) Phased Contract Arrangement

- JICA will require the Digital Partner to enter into the contract with its appointed consultant.
- The Initial Term of the contract with JICA appointed consultant will be until the end of June 2025. JICA may choose to appoint a new consultant from the beginning of August 2025 onwards in which case there will be a need for a fresh new contract between the Digital Partner and the newly appointed JICA consultant. The new JICA consultant may require due diligence again to conclude subsequent contract with the Digital Partner.

- The Digital Partner will cooperate in any such transition from one appointed consultant to another. Any failure on part of Digital Partner (including but not limited to failure to enter into a new contract) will be a material breach.

## 1.2. Submission Process & Proposal Formats

- Electronic submission must be received at JICADxLabTransportStack@bcg.com by the latest 11:59 AM Indian Standard Time on 10 May. The email subject needs to be changed to “JICA-Bengaluru-TS”, followed by your organization name.
- The submission shall consist of the three separate files, Overview of General Information, Technical Proposal Pitch Deck, and Commercial Proposal (password protected), all in the form of PDF. Note that all submission materials need to be prepared in English. The size of all files should be less than 70 pages each (including annexures, ensuring minimum 12 font size).
- Bidder may make inquiries/information requests by email to JICADxLabTransportStack @bcg.com. For any inquiry, the email subject must be changed to “**JICA-Bengaluru-TS-Query**”, followed by your organization.

### 1.2.1. Overview of General Information

- Provide all the following information by filling out the forms provided in the Attachment 1 - Proposal submission formats

### 1.2.2. Technical Proposal Pitch Deck

- Bidder’s technical proposal will be evaluated on following six parameters:
  - (1) Financial stability (5%)
  - (2) Relevant project credentials (30%)
  - (3) Quality of proposed architecture (25%)
  - (4) Implementation approach (15%)
  - (5) Availability of accelerators (10%)
  - (6) Team profiles – Quality & relevance for RFP scope execution (15%)
- Bidder’s description and business/technical qualifications should be presented concisely in this order to include the following information, by filling out the forms provided in the
  - (1) Financial stability
    - This may include but is not limited to the company’s history, financials, structure and management, number of employees, location, and management policy.
  - (2) Relevant project credentials
    - A Bidder to submit 6 (six) project execution reports exclusive in nature showcasing credentials / experience with respect to tech enablement in mobility sector, full stack development, citizen/ customer facing applications development and others.
    - If any Bidder has undergone corporate restructuring (including merger, demerger, hive off, slump sale, etc.) in the last three financial years (FY 2022-23, 2023-24, 2024-25), it must showcase the credentials of its former or current entity, provided sufficient documentary proof is submitted with an undertaking to evidence that such credentials have been transferred to the bidding entity and that the bidding entity is authorized to use these credentials. Notwithstanding the foregoing, the credentials of the parent entity, holding entity, subsidiaries, or affiliates cannot be used (and will not be considered) unless such parent entity, holding entity, subsidiaries, or affiliates are themselves bidding in this RFP.
  - (3) Quality of proposed architecture
    - Detailed system architecture (i.e. technology, infra and integration) along with proposed tech stack, rationale behind the choices made, references of the case studies/ project executed by Bidder in past.

(4) Implementation approach

- Outline the project approach and methodology for the development of the Transport Stack with mobile responsive web and integration across existing and planned tech. system and support post launch i.e., detailed implementation plan, including the milestones, timeline, and the resources deployment strategy. Also, this includes an execution strategy for capability building & training and documentation.

(5) Availability of reusable components

- Details of reusable components available / proposed to be used for delivery of data products detailed out in 3.1.7
- Reusable components refers to data sets or software which pre-exist with the bidder which will support in accelerating the development process.

(6) Team profiles – Quality & relevance for RFP scope execution

- A detailed breakdown of roles and responsibilities of the project team to be deployed, including a project manager, solution architect, domain expert, delivery manager, UI/UX designer, software developer, security specialist, QA engineer, business analyst, and any other relevant personnel.
- The proposal should also describe the qualifications, certifications, and experience of each team member, highlighting their relevant experience and expertise in developing and implementing technology-based solutions in mobility sector, full stack development with Application Management System (“AMS”) & Run Operations (“RunOps”), citizen / customer facing applications development, APIs building & system integration, Information Technology and Operational Technology (“IT-OT”), and others.

(7) Any other details relevant to achieve the scope of work

### 1.2.3. Commercial Proposal

- A Bidder shall provide a total expected cost (after including all payable duties and taxes) and a detailed breakdown of the costs associated with the Contract, including personnel & and implementation resources. (Details in Form 1.7 Commercial Bid)

## 2. Evaluation Process and Criterion

### 2.1. Evaluation Process – Introduction

(1) Bid submission

- Bidder to submit proposals to this RFP along with the requisite documentation in the prescribed formats.

(2) Eligibility check

- Eligibility of all the Bidders will be evaluated basis the criteria laid down in 2.2.
- The Bidders failing to meet the eligibility criteria will stand disqualified and their technical/financial bids will not be opened.

(3) Presentation

- The eligible Bidders basis eligibility criteria to give an oral presentation/Q&A in English based on the submitted documents/ pitch deck with key team members to be present in person, with extended project team joining online.

(4) Bid evaluation

- The eligible Bidders will be evaluated as per the technical evaluation criteria prescribed in 2.3 below to be shortlisted. Commercial bids of the shortlisted Bidders will be opened thereafter and evaluated as per the commercial evaluation criteria prescribed in 2.4 below.
- Evaluation criteria proposed to be adopted will be Quality and Cost Based Selection (QCBS) where Technical Bid Score will get a weightage of 80% and Commercial Bid Score a weightage of 20%.

(5) Award of Contract

- The Bidder whose bid secures the highest total score as per above evaluation will be considered as the best evaluated Bid for selection as the Digital Partner.
- In case of a tie where two or more Bidders achieve the same highest overall score, the Bidder with the higher technical score will be selected as the Digital Partner.

## 2.2. Stage 1 – Bidder eligibility criteria

(1) Eligibility criteria

- Eligibility criteria mentioned below are necessary requirements that a Bidder must meet to be eligible to submit a proposal.
- There is a screening mechanism to ensure that only capable and qualified Bidders who can deliver the services or products required are considered. They include criteria related to Legal Entity in India, years of operations, conflict of interest, legal history, and debarment. Failure to meet any of these requirements will lead to an automatic disqualification from the bidding process.
- For consortium bids, the Contract will be executed with the Lead Member.

Sr no	Metrics segment	Criteria	Documentation requirements
1	<b>Legal entity in India</b>	Legal entity in India (firm/company/ partnership/ proprietorship firm registered under the Companies Act, 2013)	Copy of certificate of incorporation / partnership/ any other government recognized certificate.
2	<b>Years of operations</b>	Minimum of 2 years' operating in the technology development (custom App/ software development)	Copy of certificate of incorporation / partnership/ any other government recognized certificate
3	<b>Conflict of interest</b>	Bidder must only participate in one bid. None of the Bidder's subsidiary or associate or holding company or companies having common director/s or companies in the same group of promoters / management shall participate in the bid process.	Self-certification from CEO/Authorized signatory.
4	<b>Legal history</b>	Bidder's management and proposed team members do not include members who have a history of corruption, arrest records, or involvement with criminal organizations	Self-certification from CEO/Authorized signatory.

5	<b>Debarment</b>	Bidder not debarred/blacklisted by JICA in past are only allowed to bid.	Self-certification from CEO/Authorized signatory.
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(2) Continued Eligibility

- The eligible Bidders must continue to meet the eligibility criteria prescribed in the RFQ document (based inter-alia on which they were shortlisted) and should continue to meet these until the award of the Contract. Bidders must provide evidence of their continued eligibility, if requested.
- Furthermore, it is the Bidder's responsibility to ensure that its experts, service providers, Bidders and/or their employees similarly continue to meet such eligibility criteria.

**2.3. Stage 2 – Technical bid evaluation**

**Technical evaluation score will contribute to 80% of total bid score.**

- (1) The proposals submitted by the eligible Bidders will be evaluated on 6 broad parameters, based on the submitted technical proposals and the presentation.

**Technical bid evaluation criteria**

Sr. No.	Parameters	Criteria	Max. Marks
1	<b>Financial Stability</b>	Prorated scoring basis of average of annual revenues in the last 2 years	<b>5</b>
2	<b>Relevant project credentials</b>	<p>A Bidder must submit 6 unique/exclusive project execution cases. Each case can simultaneously fulfill one or more of the following categories. However, a Bidder must ensure that at least 2 cases satisfy each criterion: - <b>6*5 marks</b></p> <p><b>Projects in India:</b></p> <ul style="list-style-type: none"> <li>- at least 2 in India with relevant tech. experience across any of the 4 areas: Mobile apps development, APIs building &amp; integration, core applications, and IT-OT;</li> </ul> <p><b>Mobility Sector Projects:</b></p> <ul style="list-style-type: none"> <li>- at least 2 in urban mobility sector including bus / metro operators (platform implementation for mobility/ multi- modal transportation will be preferred);</li> </ul> <p><b>Full Stack Implementation Projects:</b></p> <ul style="list-style-type: none"> <li>- at least 2 full stack implementation projects with AMS &amp; RunOps irrespective of geography/sector</li> </ul> <p>Projects will be evaluated on basis of relevance to RFP scope, future compliant, relative in size &amp; scale of implementation to Bengaluru.</p> <p>Each project must have a minimum size of USD 20k and must have started within last 5 years (from FY2019).</p>	<b>30</b>
3	<b>Quality/robustness of the proposed solution architecture</b>	<p>Front-end - Channels – <b>5 marks</b></p> <p>Backend - System of Engagement – <b>5 marks</b></p> <p>Integration &amp; API – <b>5 marks</b></p> <p>Infrastructure – <b>5 marks</b></p> <p>OEM software tools – <b>5 marks</b></p> <p><i>(Bidder should provide references from past projects along with clear rationale for choice of tech. stack)</i></p>	<b>25</b>

4	<b>Implementation approach</b>	Project plan & agile delivery – <b>5 marks</b> Capability building & training– <b>4 marks</b> AMS & RunOps approach – <b>3 marks</b> Documentation – <b>3 marks</b>	<b>15</b>
5	<b>Availability of reusable components</b>	Number of accelerators deployed – <b>4 marks</b> Nature of accelerators – <b>3 marks</b> Application of accelerators – <b>3 marks</b>	<b>10</b>
6	<b>Team profiles - Quality &amp; relevance for RFP scope execution</b>	Project Lead/ Manager – <b>4 marks</b> Solution/App Architect – <b>4 marks</b> Domain Expert – <b>4 marks</b> Delivery Manager – <b>3 marks</b>	<b>15</b>

- (2) JICA reserves the right to check/validate the authenticity of the information provided against the parameters in the evaluation criteria and the requisite support must be provided by the Bidders. Component wise details and methodology on how the Bidders will be evaluated on each of the technical evaluation criteria are provided in Table 1 below.
- (3) Particularly, for a contract of such a scale and complexity, it is imperative that the Bidders should deploy best in class professionals to ensure successful execution.
- All the four named Experts who are subject to technical evaluation - Project Lead, System Architect, Domain Expert and Delivery Manager - are recommended to be present in the presentation and may be interviewed / assessed during the presentation.
  - Constraints on availability of Experts proposed must be stated. If necessary, backup resource profile shall be attached.
  - A Bidder must commit 100 (Hundred) per cent time availability of the named Experts since Day 1 of the Contract.
  - The named Experts cannot be replaced without a prior approval by JICA. If replaced, the newly appointed Experts shall be of equal or higher competence.
- (4) The Bidders with an aggregate technical score of 70 or more will be shortlisted for commercial bid evaluation. Failing to secure minimum 70% marks will lead to technical rejection of the Bid.

## Technical evaluation criteria and scoring guidelines

Table 1

Dimension	Criteria	Max. Marks	Scoring Guidelines
<b>Financial Stability (5)</b>	Annual turnover In case of Consortium, the total turnover of the Lead Member only will be considered	<b>5</b>	<p>Scoring basis of average of annual revenues in the last 2 years</p> <p>Score 0 - <math>X &lt; \\$100,000</math></p> <p>Score 1 - <math>\\$100,000 &lt; X &lt; 200,000</math></p> <p>Score 3 - <math>\\$200,000 &lt; X &lt; 1 \text{ Million}</math></p> <p>Score 5 - <math>&gt; \\$1 \text{ Million}</math></p> <p>Revenue criteria not applicable for “Not for Profit” platforms established in the transport sector.</p>
<b>Relevant project credentials (30)</b>	<p>A Bidder must submit 6 unique/exclusive project execution cases. Each case can simultaneously fulfill one or more of the following categories. However, a Bidder must ensure that at least 2 cases satisfy each criterion: - <b>6*5 marks</b></p> <p><b>Projects in India:</b></p> <ul style="list-style-type: none"> <li>- at least 2 in India with relevant tech. experience across any of the 4 areas: Mobile apps development, APIs building &amp; integration, core applications, and IT-OT;</li> </ul> <p><b>Mobility Sector Projects:</b></p> <p>at least 2 in urban mobility sector including bus / metro operators (platform implementation for mobility/ multi-modal transportation will be preferred);</p> <p><b>Full Stack Implementation Projects:</b></p> <ul style="list-style-type: none"> <li>-at least 2 full stack implementation projects with AMS &amp; RunOps irrespective of geography/sector</li> </ul>	<b>30</b>	<p>Each project to be rated from 0 to 5. Projects will be evaluated on basis of relevance to RFP Bengaluru</p> <p>Score: 0 to 1 – Minimal or No Relevance The project has little to no relevance to current scope; there is a significant gap between the scope requirements and the demonstrated skills, technologies, and resources in the project.</p> <p>Score: 2 to 3 – Moderate Relevance with Identified Gaps The project is somewhat relevant to the current scope, but significant gaps are identified; Some aspects of the project align with scope requirement of skills and resources, but major areas require capability enhancement or external support. Relevant to a single category.</p> <p>Score: 4 to 5 – High Relevance and Well-aligned The project is highly relevant to the current scope, showcasing a strong alignment in skills, technologies, and resources. It showcases the</p>

	<p>Projects will be evaluated on basis of relevance to RFP scope, future compliant, relative in size &amp; scale of implementation to Bengaluru</p> <p>Each project must have a minimum size of USD 20k and must have started within last 5 years (from FY2019).</p>		<p>required capabilities to implement the RFP. Relevant to multiple categories</p>
<p><b>Quality/robustness of the proposed solution architecture (25)</b></p>	<p>Front-end – Channels</p> <p>(References from past projects will be preferred)</p> <p>Should have built a web platform to offer data services, integrated with a commuter mobile app and provided API services for partner connect.</p> <p>Detailed explanation of UI/UX technology components and services, best-in-class design patterns, tech stack (front-end), data flows, App database design approach, sequence diagrams, integrations, protocols etc. Engineering techniques to ensure the mobile App is lightweight and scalable, usage of iOS, Android, and cross-platform frameworks for apps, rationale of using one technology over another, usage of open- source tools, best practices for UI/UX design and integrations with backend services ensuring performance, resiliency, and scalability, etc.</p>	<p><b>5</b></p>	<p>Score: 0-1 - Technology components in the proposed solution (—grounds-up build) are described but not detailed.</p> <p>Score: 2-3 - Technology components in the proposed solution (—grounds-up build) are described and detailed but proposed solutions are not backed by relevant experience of executing similar work irrespective of sector</p> <p>Score: 4- 5 - Technology components (for a —grounds-up build solution) are described in detail, are contextualized and backed by relevant experience of executing similar work irrespective of sector</p>
	<p>Backend -System of Engagement</p> <p>(References from past projects will be preferred)</p> <p>Detailed explanation of tech stack used to service data services, scalable data platforms, rules engine and handling of geospatial and transportation datasets.</p>		<p><b>5</b></p>

	<p>Detailed explanation of algorithms to support use cases articulated in the subsequent sections with choice of tech stack.</p>		<p>Score: 4- 5 - Business Domain services and tech stack have been detailed, contextualized and are backed by relevant experience of executing similar work irrespective of sector.</p> <p>Ex: Comprehensive approach that encompasses real-time data processing integration with third-party services, scalability, security, data analytics, incident monitoring and maintenance.</p>
	<p><b>Integration &amp; API Platform</b></p> <p>(References from past projects will be preferred)</p> <p>Detailed approach to build data catalogue as well as the ability to serve data feeds, and integrate with suggested MaaS apps.</p> <p>Detailed explanation of tech stack supporting the integration meeting the requirements stated in NFRs.</p>	<p><b>5</b></p>	<p>Score: 0-1 - Integration components with tech stack have been described but are not detailed out.</p> <p>Score: 2-3 - Integration components with tech stack have been detailed and contextualized but are not backed by relevant experience of executing similar work irrespective of sector</p> <p>Score: 4-5 - Integration components with tech stack have been detailed, contextualized and are backed by relevant experience of executing similar work irrespective of sectors.</p> <p>Ex: Integration patterns, list of guiding principles and best practices, detailed list of outbound and inbound interfaces including detailed integration design for selected interfaces, rationale for technology choices made, mechanisms to manage performance, scalability, security and monitoring</p>
	<p><b>Infrastructure</b></p> <p>(References from past projects will be preferred)</p> <p>Detailed infrastructure architecture with approach on infra as a code, scalability, security and is agnostic to any infrastructure provider, The infrastructure architecture should also support multi-tenancy.</p>	<p><b>5</b></p>	<p>Score: 0-1 - Infrastructure components in the proposed solution are described but not detailed.</p> <p>Score: 2-3 - Infrastructure components in the proposed solution are described and detailed, but the proposed solutions are not backed by relevant experience of executing similar work irrespective of sector.</p> <p>Score: 4-5 - Infrastructure components are described in detail, are contextualized, and backed by relevant experience of executing similar work irrespective of sector.</p>

			<p>Ex: Best practices for infrastructure management, including configuration management, automated deployment processes, monitoring tools and practices, incident response strategies, ensuring high availability, redundancy measures, and disaster recovery plans. Usage of infrastructure-as-code (IaC) tools such as Terraform, Ansible, or CloudFormation. Ensuring data security, implementing regular security audits, and compliance with industry standards.</p>
	<p>OEM software tools</p> <p>(References from past projects will be preferred)</p> <p>All software components should be described as part of the architecture document with minimal use of licensed platforms and maximize open source technology stack.</p>	<p><b>5</b></p>	<p>Score 0-1: OEM software tools have been described but are not detailed out.</p> <p>Score 2-3: OEM software tools have been detailed and contextualized but are not backed by relevant experience of executing similar work irrespective of sector</p> <p>Score 4-5: OEM software tools have been detailed, contextualized and are backed by relevant experience of executing similar work irrespective of sector</p> <p>Ex: Details of the components make, description, licensing cost, rationale for licensing model chosen based on proposed solution, enterprise support model and costs</p>
<p><b>Implementation approach (15)</b></p>	<p>Project plan &amp; agile delivery</p> <p>Detailed release plan with at least 2-3 interim releases incorporated.</p> <p>In-depth description of the methodology to implement planning, sizing and capabilities of teams with maximum level, snapshot of Microsoft Project file describing the complete project, critical path, resources assigned to each task, alternative paths, critical deliverables clearly explained.</p>	<p><b>5</b></p>	<p>Score: 0-1 - Proposed solution demonstrates a basic explanation of the project plan &amp; understanding of agile methodology</p> <p>Score: 2-3 - High level of details have been provided in the project plan (including metrics, past experience, resource plan, critical path etc.) &amp; agile methodology is contextualized. However, concrete examples/references not provided.</p> <p>Score: 4-5 - Project plan (including metrics, past experience, resource plan, critical path. milestones etc.) &amp; agile methodology detailed out and concrete examples/references are provided.</p>

	<p>Agile methodologies, proposed pod structure, ceremonies, and tools e.g., Product Backlog, Backlog grooming, Pod structure, Sprint planning and estimation, Release planning, Scaled Agile, Sprint demo etc.</p>		
	<p>Capability building &amp; training – Detailed plan of strategically developing and enhancing team skills, knowledge, and abilities to achieve long-term success and adapt to changing circumstances by means of comprehensive training, content summaries and examples (including past experience) advanced test methodologies such as usage of Behavior Driven Development (“BDD”), usage of automated frameworks with testing metrics defined and quality dashboards that provide a real time view for continuous improvements. The proposed solution provides end to end automation using best-in-class DevOps tool chain from Plan to Monitor, testing methodologies and frameworks</p>	<p><b>4</b></p>	<p>Score: 0-1 - The proposal has notable deficiencies in outlining capacity building strategies. It mentions training but fails to provide detailed plans or specifics.</p> <p>Score: 2-3 - Demonstrates a basic grasp of the requirements, some details on trainings and schedules; but falls short in offering thorough materials for impactful capacity development</p> <p>Score: 4 - Presents robust and detailed strategies for capacity development, including comprehensive training agendas, content summaries, and examples.</p>
	<p>AMS (Application management system) &amp; RunOps approach</p>	<p><b>4</b></p>	<p>Score: 0-1 - Proposed solution demonstrates a basic explanation of maintenance and run operations processes, with limited detail.</p> <p>Score: 2-3 – Provides a high level of detail in the maintenance and operations plan, covering aspects such as detailed processes, resource allocation, incident management strategies, and security measures. However, concrete examples/references are not provided.</p> <p>Score: 4 - Offers a comprehensive maintenance and operations plan, detailing processes, resource allocation, incident management strategies, security measures, and includes concrete examples/references from past projects.</p>

			<p>Ex: In-depth description of the methodology for continuous monitoring, incident management, performance optimization, and security. Explanation of tools and processes for patch management, automated alerts, and response mechanisms. References to best practices for maintaining high availability and disaster recovery.</p> <p>Detailed description of advanced DevSecOps approaches such as service catalogs, container security etc. Detailed description of</p>
	Documentation	2	<p>Score: 0.5 - Proposed documentation plan provides list of documents to be generated during course of Contract &amp; limited detail on content.</p> <p>Score: 1 – Specific details are provided in the documentation plan w.r.t critical documents i.e., technical documentation, design studies, progress reports, and training guides. Content summaries are provided but structure, templates &amp; concrete references are not provided.</p> <p>Score: 2 – Comprehensive documentation plan is offering content summaries, structure, templates, references, and timelines of release for all documents to be generated during course of Contract.</p>
Availability of reusable components	Number of accelerators deployed	7	<p>Score: 0 – No accelerators which could directly enable the data products mentioned in 3.1.7</p> <p>Score: 1-2 – Accelerators which could directly enable 20% of the data products mentioned in 3.1.7</p> <p>Score: 2-4 – Accelerators which could directly enable 40% of the data products mentioned in 3.1.7</p> <p>Score: 3-5 – Accelerators which could directly enable 50% of the data products mentioned in 3.1.7</p> <p>Score: 6-7 – Accelerators which could directly enable 75% of the data products mentioned in 3.1.7</p>
	Nature of accelerators	3	<p>Score: 0 – All accelerators relevant for data products mentioned in 3.1.7 are licensed</p>

			<p>Score: 1 – 50% of the data products mentioned in 3.1.7 are supported through licensed accelerators, remaining through in-house accelerators</p> <p>Score: 2 – 25% of the data products mentioned in 3.1.7 are supported through licensed accelerators, remaining through in-house accelerators</p> <p>Score: 3 – 0% of the data products mentioned in 3.1.7 are supported through licensed accelerators, remaining through in-house accelerators</p>
<p><b>Team profiles – Quality &amp; relevance for RFP scope execution (CV review and 1:1 Interview, if necessary)</b></p>	<p><b>Project Lead /Manager:</b> The Project Manager is responsible for planning, executing, and closing project, ensuring it is completed on time, within scope, and within budget using Agile methodologies and tools like JIRA and Trello.</p>	<p><b>4</b></p>	<p>Total score for each will be the sum of scores for (Years of experience, relevant experience, and certifications) *0.4</p> <p><u>Years of experience:</u> Score: 0 - Less than 10 years Score: 1 - 10-12 years Score: 2 - 12-15 years Score: 3 - more than 15 years</p> <p><u>Relevant experience in mobility sector:</u> Score: 1 - One relevant projects Score: 2-3 - Two relevant projects Score: 4-5 - Three or more relevant projects</p> <p><u>Certifications:</u> Score: 0 - No relevant certificate Score: 2 - Relevant certificates like PMP, PRINCE2, Certified Agile Project Manager etc.</p>
	<p><b>System Architect:</b> Design the overall architecture of the application, ensure system scalability and integration, and provide technical guidance.</p>	<p><b>4</b></p>	<p>Total score will be the sum of scores for (Years of experience, relevant experience, and certifications) * 0.4</p> <p><u>Years of experience:</u> Score: 0 - Less than 5 years Score: 1 - 5-8 years Score: 2 - 8-10 years Score: 3 - more than 10 years</p> <p><u>Relevant experience in mobility sector:</u> Score: 1 - One relevant projects Score: 3 - Two relevant projects</p>

			<p>Score: 5 - Three or more relevant projects</p> <p><u>Certifications:</u>  Score: 0 - No relevant certificate  Score: 2 - Relevant certificates like AWS/ Microsoft/ Google certified solutions architect, etc.</p>
<p>Domain expert</p> <p>Serves as a key knowledge resource, providing insights and guidance to ensure the Integrated Control Tower is designed in alignment with transportation industry standards and operational realities. Their role involves sharing expertise on transportation planning, operations, regulatory compliance, route and schedule optimization, safety and security considerations, and data-driven decision-making.</p> <p>While not directly responsible for implementation or management, the domain expert contributes by informing design decisions, offering best practices, and validating that the platform addresses real-world needs. They help bridge the gap between technical teams and operational requirements, ensuring the solution is practical, efficient, and aligned with user expectations.</p>	4	<p>Total score will be the sum of scores for (Years of experience, relevant experience, and certifications) * 0.4</p> <p><u>Years of experience:</u>  Score: 0 - Less than 5 years  Score: 1 - 5-8 years  Score: 2 - 8-10 years  Score: 3 - more than 10 years</p> <p><u>Relevant experience in mobility sector:</u>  Score: 1 - One relevant projects  Score: 3 - Two relevant projects  Score: 5 - Three or more relevant projects</p> <p><u>Certifications:</u>  Score: 0 - No relevant certificate  Score: 2- Relevant certification - Transport/mobility-focused certification, Digital Twin / BIM Certifications, Smart Mobility courses like ITDP, NACTO, IRSE Certification, Tech Diploma in Transportation Engineering</p>	
<p>Delivery Manager</p> <p>Delivery Manager oversees the successful delivery and post-deployment support, ensuring client satisfaction, managing resources, and optimizing operational efficiency.</p>	3	<p>Total score will be the sum of scores for (Years of experience, relevant experience, and certifications) * 0.3</p> <p><u>Years of experience:</u>  Score: 0 - Less than 5 years  Score: 1 - 5-8 years  Score: 2 - 8-10 years  Score: 3 - more than 10 years</p>	

			<p><u>Relevant experience in mobility sector:</u>  Score: 1 - One relevant projects Score: 3 - Two relevant projects  Score: 5 - Three or more relevant projects</p> <p><u>Certifications:</u>  Score: 0 - No relevant certificate  Score: 2 - Relevant certificates - PMP, PRINCE2, Certified Agile Project Manager</p>
	<b>Total Score</b>	<b>100</b>	



## 2.4. Stage 3 – Commercial bid evaluation

**Commercial bid evaluation will contribute to 20% of total bid score.**

- (1) The commercial bid scores of each shortlisted Bidder will be evaluated as ***(Minimum Bid quoted among all bidders / Value quoted by the bidder of the Bid)\*100***. The commercial bids to be calculated in USD.
- (2) A Bidder to ensure that commercial bid submitted in USD, including all taxes, levies, duties, etc.
- (3) Arithmetical errors will be rectified on the following basis:
  - If there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price shall be corrected.
  - If there is a discrepancy between words and figures, the amount in words will prevail.

## 2.5. Stage 4 – Final scoring and selection

Final Scores for each shortlisted Bidder will be calculated as follows:

***Final Score = 80% \* Technical Score + 20% \* Commercial Score***

- (1) The Bidder achieving the highest Final Score, reflecting a balanced mix of technical proficiency, organizational capability, strategic approach, and financial competitiveness, will be selected for the issuance of the Letter of Intent and subsequent initiation of Contract for engagement on the work outlined in the RFP.
- (2) Should the contracting process fail, the JICA reserves the right to proceed to the next highest scoring Bidder and so on.

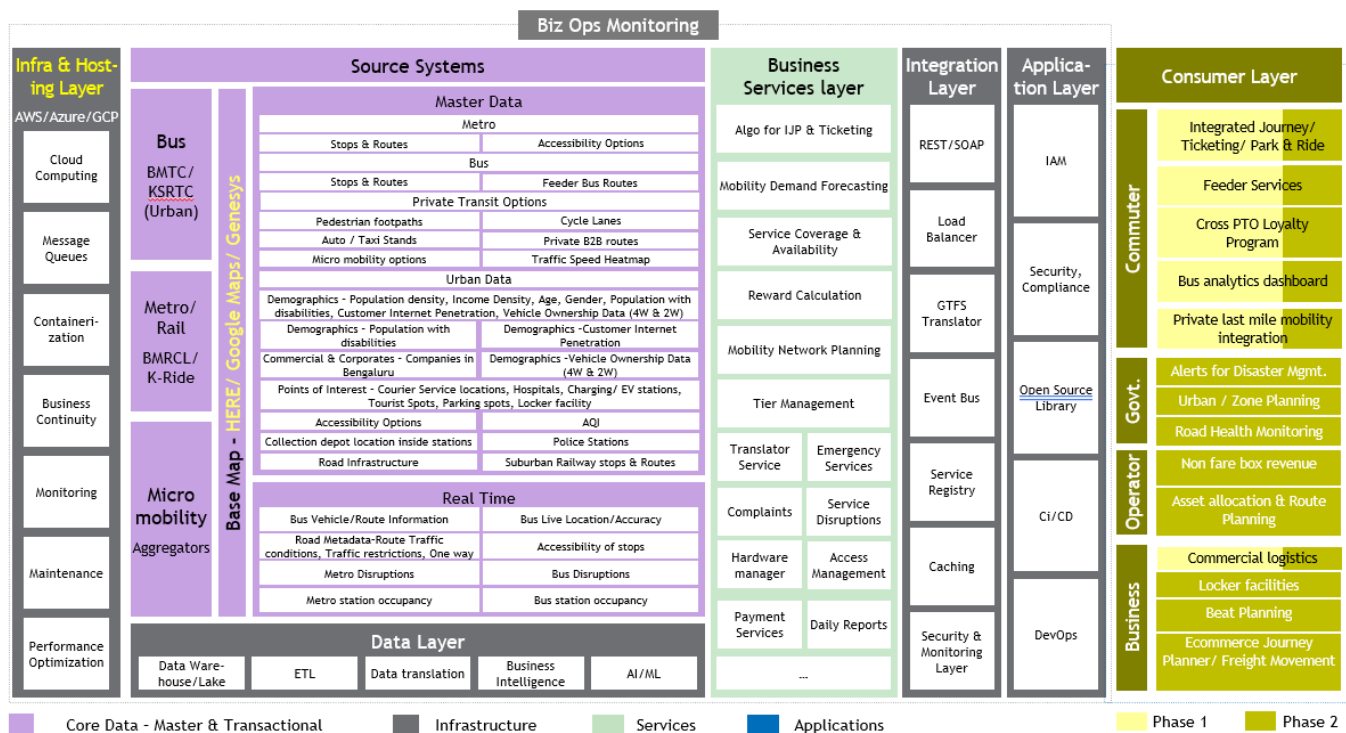
### 3. Scope of Work

The scope of work are divided into three major components:

- (1) Transport Stack Cloud platform setup with services and integrations with specified data sources and target applications
- (2) Web Portal cum marketplace
- (3) Use case implementation

#### 3.1. Transport Stack Cloud Platform Setup

- Please find below the reference Architecture for Transport Stack.
- Transport stack provisioned on a CSP of choice should comprise of all the layers and corresponding building blocks mentioned in the reference architecture.



#### 3.1.1. Infra & Hosting Layer

The Digital Partner to manage the cloud infrastructure, including but not limited to the following, to enable the implementation of different use cases.

- High performing compute services using VM's / hyperscaler instances on cloud to empower high intensity workloads
- Provision to use data storage resources on cloud:
  - Block storage stores data in blocks like an SSD or hard drive
  - File storage stores data as files like in a NAS
  - Object storage stores data as objects similar to those in object-oriented programming
- Cloud powered networking, switches and API gateway's to perform load balancing and data packet sequencing
- Usage of cloud databases – with a flexibility to use graph, GIS, relational file, object DB's and many more on subscription

### 3.1.2. Integration Layer

- The Digital Partner to setup the integration layer for Transport Stack and perform integration with different data sources as listed in the Table 2.
- Following scope and tech specifications to be referred to setup the Transport Stack Cloud Platform and its integration layer, unless otherwise agreed differently by the parties during the service delivery.
- If any system is not available with any entity and the data is prepared in digital files (excel, CSV or any other suitable format), appropriate provisions to be made for the periodic transfer of such data to maintain in Transport Stack.

#### (1) Integration architecture

- Service Mesh Architecture – Integration services from a choice CSP provides interservice communication, load balancing and service discovery
- Containerized services – using dockers or similar on cloud server providers
- Ingestion of data using cloud connectors and data pipelines from the source applications
- Usage of Kubernetes on choice CSP recommended to automate the container management, scaling & cluster data sharing

#### (2) API server & gateway features

- API management service on choice CSP can be used to build Web APIs using microservices frameworks
- Need to manage APIs as a product - maintained & prioritized using API evolution backlog
- API risk catalog needs to be defined and maintained
- Search flexibility (geo-spatial, text, relationships), create, update, list meta-info objects

#### (3) Event bus for communication

- Hazelcast or similar can be used for meta data exchange between the instances as a shared data store
- Zookeeper or similar can be used as a coordination service between clients & servers
- Use of Kubernetes recommended trigger pod to pod linkage and in order to coordinate container clusters

**Table 2: List of Source Systems for Integration**

Category	Source Systems (illustrative list)
Metro	AFC System Scheduling System Central Data Platform (if available)
Train	GPS/ RTIS Data Public convenience facilities (escalator, toilets etc. via digital feeds/ Static data) Extract schedules and other data points from open websites

Category	Source Systems (illustrative list)
Buses	AVLS Depo Management / Scheduling System AFC System Vehicle Health Monitoring System Panic / SoS System Incident Management System Complaint Management System Public convenience facilities (escalator, toilets etc. via digital feeds/ Static data) Extract schedules and other data points from open websites
Micro-mobility	Discovery and Booking System
3 <sup>rd</sup> party	Mobile Location Data Traffic Data Point of Interest Data Weather Data or any other datasets needed for different analytics or use case implementation

### 3.1.3. Data Layer

- The Digital Partner to setup the Data layer for Transport Stack to manage the datasets, collected via integration with different data sources or manual file transfers.
- Following scope and tech specifications to be referred for setting up data layer, unless otherwise agreed differently by the parties during the service delivery.

#### (1) Data warehouse plus Data Lake

- Providing durable, scalable components to store and manage vast quantities of data on choice CSP
- Lake House Architecture should natively integrate to provide an integrated storage layer that supports unstructured as well as highly structured and modeled data.
- The storage layer can store data in different states of consumption readiness, including raw, trusted-conformed, enriched, and modeled.

#### (2) ETL

- Transforming data into a consumable state through data validation, cleanup, normalization, transformation, and enrichment.
- Provide purpose-built components to perform a variety of transformations, including data warehouse style SQL, big data processing, and near-real-time ETL, using native services on a choice CSP of choice
- ETL and ELT pipelines using cloud capabilities
- Big data processing using capabilities like spark or similar

#### (3) Data Translation

- Building or housing on a CSP of choice ready to use data format converter to transform source data into recognized data standards such as GTFIS, GBFS, BeckN etc.

#### (4) Business Intelligence and machine learning

- Providing services to perform interactive queries and simulation capabilities with business intelligence and Machine learning capabilities
- AI/ML algorithms for SMART models and predictive calculations

### 3.1.4. Performance & scalability

(1) Data Processing Speed

- The solution should adhere to industry standard data processing speeds
- Real-time data processing latency to be in the milliseconds to seconds range
- System must be able to handle high throughput, processing millions of events or records per second
- The system should be able to handle batch processing data volumes upto few terabytes in minutes to hours.

(2) Data Query Speed:

- The system should have response time for querying data return results in seconds to minutes for moderate to large-sized datasets (e.g., 500GB to 1 TB).

(3) Data Transformation Speed

- The system should have data Transformation time for medium to complex transformations in the range of 1-5 minutes per GB of data

(4) Data Storage and Retrieval Speed

- The system should be able to read and store the data at the rate of several GB per second,

(5) Data availability in dashboards/reports

Users	Number
Dashboard Users	500
Concurrent Users across platform	50
Responsiveness	1-3 secs The dashboard screens response time is expected to be ~2 seconds per tab refresh including data and information load

(6) Data availability in website

Users	Number
Users	20000
Concurrent Users across platform	200
Responsiveness	1-3 secs The website screens response time is expected to be ~2 seconds per tab refresh including data and information load

(7) Data availability in API

Users	Number
API calls supporting Users	20000
Concurrent Users across platform	200
Responsiveness	1-1.5 secs The API response time is expected to be ~1 seconds per tab refresh including data and information load

(8) Application availability

- Application is expected to be available 99.5%.

(9) Scalability

- The solution must be able to scale horizontally and vertically to meet growing data and processing demands. The vendor must provide a detailed scalability plan, including recommendations for infrastructure growth and resource allocation.
- The solution must support auto-scaling capabilities, automatically adjusting resources in response to fluctuating workloads and traffic. The vendor should define thresholds and strategies for auto-scaling based on system load and performance requirements.
- The solution must be able to handle increasing data volumes without a degradation in performance. The solution must maintain or improve performance (e.g., data processing speed, query response time) as the scale of data increases.
- The data storage solution must support the scalable growth of data. The vendor must describe the data storage architecture and outline how the system can scale to accommodate future data growth without requiring a full redesign of the system.

### 3.1.5. Security Layer

The Digital Partner to make the necessary provisions for security of the Transport Stack Cloud Platform and data in line with recognized standards and govt. guidelines as applicable for different types of data processed or managed on the platform. Following scope and tech specifications to be referred, unless otherwise agreed differently by the parties during the service delivery –

(1) Identity & access management

- Role based authorization for access to specific services
- Authorization policies like – UMA 2.0 managed GrantFlow, OAUTH2.0 – asynchronous authorization grant

(2) Authentication

- Digital certificate based authentications for issuing tokens
- API gateway used for authenticating, controlling & analyzing API traffic

(3) Tokenization

- Usage of JWT tokens for secure exchange of data across the web

(4) Platform Security

- Data encryption at all levels and integration layers. HL7/FHIR integration standards to be followed
- Static IP based secure integration for specific servers and services
- Security logs corresponding to sessions to be maintained.
- Web access firewalls
- Rate limiting provisions for preventing DDOS attacks for open resources

(5) Data Security

- Strong Data model allowing for isolation of sensitive user data
- Data at rest – Admin only access on the cloud platform
- Data on the move – Encryption
- Data masking in case of specific data extracts pertaining to users
- Data security protocols and requirements to ensure the protection of sensitive and confidential data (e.g. secure APIs).

(6) VAPT (Vulnerability Assessment and Penetration Testing)

- Penetration test before major production release to identify existing or potential issues / flaws
- Analyze security vulnerabilities and implement preventive actions

(7) Audit Trails

- The vendor should implement logging and auditing mechanisms to track changes, accesses, and data movements.

### 3.1.6. Application Layer

The Digital Partner to ensure that all the components (frontend + backend) build, test, and deployed on Transport Stack to follow fully automated DevOps pipelines. Following scope and tech specifications to be referred, unless otherwise agreed differently by the parties during the service delivery –

(1) Environment management & containerization

- There should be three type of environments that should be setup:
  - Application development environment – to be used for application build
  - Test environment – to be used for testing & bugs reporting
  - Production environment – to be used for live application
- Single click environment provisioning for dev sandboxes
- Integration, pre-prod, and performance environment setup
- Multi-browser testing solutions (such as Browser stack) to be used

(2) CI/CD

- CI/CD pipelines with quality gates integrated; with single click onboarding for all projects
- All PRs to get checked before merged and qualified via quality gates and test execution results
- DB schema change management as code
- Infrastructure configuration as code

(3) Open Source Libraries

- Use of Github or Bitbucket to manage all the source code

(4) Testing

- Performance testing (stress, spike, load, longevity)
- API testing
- Test data management for easy population and management of data across these environments
- All test cases to be managed in a ticketing system and updated post each run with results

(5) Monitoring/Alerting

- Reporting around environment utilization, releases, test execution status, etc.
- Alerting/Monitoring around all services in integration environment

### 3.1.7. Business Services Layer

- Business Services Layer includes the replicable products and services as Open-Source modules that can be subscribed by the Transport Stack users (App Developers, Transport Operators etc.). The Digital Partner to develop the products and services listed in Table 3.
- All the products/services listed in the Table 2 are expected to be hosted on Transport Stack Cloud Platform. The Digital Partner should create necessary provisions for the Transport Stack users to subscribe to such products / services.
- The Digital Partner may leverage the products / services it has developed in past to use as an accelerator for building different products / services listed in the table above. However, It is the

responsibility of the Digital Partner to evaluate and manage the necessary changes / upgrades required in such products / services to meet the requirements listed in Table 3 or as mentioned in corresponding use cases where such products/services would be leveraged.

**Table 3: List of Products / Services to be developed for creation of Open-Source Component**

Category	Product / Service	Description
Base Data products	Multi-modal Maps	<p>This dataset supports an open-source, multi-modal mapping framework designed to facilitate real-time discovery of the nearest accessible public transport nodes and optimized routing from origin to destination.</p> <p>It encompasses geolocated data points for a variety of transit modes, including but not limited to: metro stations, suburban and local railway stops, bus depots, monorail stations, and micro-mobility hubs (e.g., Aggregators, Micro-mobility players). Additionally, the dataset integrates spatial metadata on public and commercial parking facilities, including availability indicators where applicable.</p>
	Open Transit Data	Public API to get access to static and real-time information for different transport modes and ancillary services (such as parking) under scope. This involves data ingestion, cleaning etc and serving data on a public network via Open API.
Algorithm/ Logic	Multi-Modal Journey Planner	<p>A suite of publicly accessible APIs, secured via an authorization layer, enables users to retrieve feasible multi-modal travel routes from point A to point B. These services are powered by an open-source, multi-modal map enriched with registered transit stops for trains, buses, and other mobility options.</p> <p>Authorized subscribers interact with the journey planning system using API tokens. Each request specifies an origin and destination in geospatial coordinates. The API responds with all viable routing options—spanning both single-mode and multi-modal journeys—with optional inclusion of first/last-mile parking availability and integration.</p>
	Micro -mobility discovery & booking	Open APIs for discovery and booking of micro-mobility services service integration option for all the micro-mobility service providers that are directly integrated on the transport stack. This service will include all the necessary utilities (search, select, book, validate, cancel) related to micro-mobility services
	Micro -mobility & Feeder services & B2B charter supply planner	A suite of publicly accessible APIs, secured via an authorization layer, enables service providers to plan resource supply (vehicles, buses etc.) based on transit demand patterns.

<p>Integrated ticketing</p>	<p>A set of APIs designed to interface with multiple transit ticketing platforms, enabling the creation of a unified, seamless payment experience across transport modes.</p> <p>The APIs support core functions such as:</p> <ul style="list-style-type: none"> <li>• Retrieving fare information based on origin-destination pairs and transit stops</li> <li>• Applying configurable business rules, including discounts and fare capping</li> <li>• Processing consolidated payments through a configurable payment gateway</li> <li>• Reconciling fare distributions across different transit agencies and operators</li> <li>• Generating and delivering trip-level invoices or receipts to end users;</li> <li>• Integration into fare collection system and required reports</li> </ul> <p>These services enable consistent pricing logic, simplified transactions, and streamlined reporting across multi-modal journeys, making them suitable for integration into MaaS applications or mobility platforms.</p>
<p>Loyalty program for multi-modal journey</p>	<p>A set of APIs and backend services designed to manage and operate a unified loyalty and rewards program across multiple modes of transport, incentivizing frequent and sustainable travel behavior.</p> <p>The services support core functions such as:</p> <ul style="list-style-type: none"> <li>• Accruing loyalty points based on journey distance, fare amount, mode of transport, or frequency of travel</li> <li>• Applying configurable business rules for promotions, bonus points, and targeted campaigns</li> <li>• Redeeming points for rewards such as free rides, discounts, partner offers, or upgrades</li> <li>• Managing user loyalty tiers with associated benefits</li> <li>• Enabling integration with external loyalty programs</li> <li>• Generating analytics and reports on user engagement, reward redemptions, and program effectiveness</li> <li>• Providing secure and seamless integration with MaaS platforms, fare collection systems, and operator backends</li> </ul> <p>These services enhance user engagement, promote consistent ridership, and offer a flexible tool for transport agencies and operators to drive loyalty, improve service adoption, and build long-term customer relationships.</p>

	<p>Park &amp; ride</p>	<p>A set of APIs and backend services designed to facilitate seamless booking and management of parking spaces near major transit hubs, enabling integrated multi-modal journeys that combine private vehicle use with public transport.</p> <p>The services support core functions such as:</p> <ul style="list-style-type: none"> <li>• Discovering available parking locations near metro stations, railway terminals, and bus stops</li> <li>• Reserving parking spaces in real-time with configurable time slots and pricing options</li> <li>• Bundling parking bookings with transit tickets for unified, single-step user experience</li> <li>• Applying business rules for dynamic pricing, discounts, and loyalty benefits</li> </ul> <p>These services enable commuters to plan, book, and pay (via integrated ticketing) for both parking and public transport in one seamless flow, encouraging public transport use by simplifying overall journey convenience.</p>
	<p>Services Discovery Index</p>	<p>This service/platform will enable the subscriber to discover all the active services on the transport stack. This will act as the first entry point for subscribers from where they can consume any other services in the stack. This will also show the uptime of each service.</p>
	<p>Network planning for feeder services</p>	<p>This platform will enable the identification of potential routes for launching feeder bus services by analyzing traffic patterns and catchment area demographics</p>
<p>Ops Analytics</p>	<p>Bus analytics dashboard</p>	<p>Interactive dashboards designed to support multiple visualization types and dynamic data slicing across various dimensions, enabling rich analytical views of user behavior and system performance.</p> <p>The dashboards are powered by datasets captured at key user journey touchpoints—search, booking, and trip completion. Metrics are aggregated from multiple data sources, then processed through data cleaning and transformation pipelines. Business logic is applied to derive actionable KPIs, such as mode preference trends, route efficiency, booking conversion rates, and revenue attribution for buses including feeder services. Solution to also support Depot management analytics e.g. in-shedding and out-shedding, route adherence, schedule adherence, utilization rate etc.</p> <p>These dashboards are built to support real-time and historical views, with drill-down capabilities for operators, planners, and policy stakeholders.</p>

### 3.1.8. Digital Services Layer

- As part of Transport Stack, we aim to setup a web-console cum marketplace for data, functions and solutions, to be developed by the Digital Partner.
- Web-console is expected to have several features, along with digital services for the users. Examples of such digital services include query management and survey tool for user feedback
- The Digital Partner should provision for following elements while designing the Transport Stack Cloud Platform, however these elements will be enabled in subsequent releases of Transport Stack.
- Chatbot to answer common queries on Transport Stack services
  - Text based chatbot with English language
  - Chat window/session/front end application interface.
  - Self-learning bots with deep learning model for Natural Language Processing
  - Corpus or training data for training the NLP model.
  - Application Database for processing actions to be performed by the chatbot
- Cloud sourcing platform to collect information on commuter behavior / travel patterns / feedback via MaaS apps

### 3.1.9. UI/UX Layer

- UI/UX layer of Transport Stack will include the following items -
  - Web portal cum Marketplace
  - Bus Ops Dashboard
- Following specifications to be referred for different items, unless otherwise agreed differently by the parties during the service delivery -
  - Micro front-end UI development
  - Lazy loading
  - Caching on Client side
  - Optimized assets (images, videos)
  - Low network speed/no-network handling
  - Memory management and profiling

### 3.1.10. Module Development and Contribution Requirements

- To ensure reusability & interoperability of modules available under Transport Stack, the Digital Partner shall build upon existing components (wherever applicable) & contribute reusable component back to the transport stack repository which has been created under the Delhi Transport Stack project and is currently maintained by JICA and its designated agency.

#### 3.1.10.1 Reuse of Existing Transport Stack Components

- The Digital Partner shall be required to:
  - Re-use and extend relevant modules wherever applicable, from the transport stack repository.
  - Ensure full compatibility with the established architectural patterns, interface definitions, and data standards published as part of the Transport Stack technical documentation.
  - Publish target architecture including the re-usable components, new components to be built and adhering to data connector definitions.
  - Justify any deviation from reuse of already existing module, subject to review and approval by the Authority/Client's Technical Committee.

#### 3.1.10.2 Contribution of Common Base Modules

- In the event that the Digital Partner develops over the re-usable modules or components:
  - The changes to the module shall be included as part of reusable libraries, adhering to the principles of modularity, scalability, and decoupling.
  - The Digital Partner shall ensure that such modules are committed back to the transport stack repository.

- Contributions must comply with:
  - The Transport Stack’s coding standards and architectural conventions.
  - Required documentation and testing protocols.
  - Open-source licensing norms as applicable

### 3.1.10.3 Standard Adherence practices

- All modules developed as part of this engagement shall be:
  - Designed, documented, and delivered as open-source modules, in alignment with the established standards.
  - Designed to support extensibility, localization, and interoperability in adherence with transport stack coding standards.

### 3.1.10.4 Review and Acceptance

- All source code, documentation, and contributions made under the above provisions shall be subject to:
  - Code review and approval of the re-usable commit by the designated technical team of JICA DXLab or its designated agency.
  - Inclusion in the Transport Stack’s version-controlled repository.

## 3.2. Non-functional Requirements

- The following non-functional requirements shall be applicable transport stack web portal.

Criteria	Description
Supported Screen sizes /resolution 601 x 962 768 x 1024 810 x 1080 820 x 1180 1280 x 800 2560 x 1600 2048 x 2732	All popular tablet screen sizes (7 Inches or 10.2 Inches) Minimum screen size supported: 5 inches (limit the download) Maximum screen size supported: 12.9 inches (iPad Pro) Adaptive towards Aspect ratio
Screen layout (mobile devices) 360 x 800 390 x 844 393 x 873 412 x 915 414 x 896 360 x 780 1440 x 3200 2208 x 1768	All Popular mobile phone screen layouts Minimum screen size supported: 6 inches Maximum screen size supported: 7.6 inches (Samsung Z Fold)  Minimum screen resolution: 360 x 800 px (Samsung S20) Maximum screen resolution: 1440 x 3040 px (Samsung Z Fold)
Supported Screen sizes (Laptop) 1920×1080 1366×768 1536×864 1280×720	Support for desktops from size 13”-15”
Browser supported with version	Internet Explorer IE 11 and above ; Edge
	Safari 15 and above
	Firefox 89 Onwards
	Google Chrome 94 and above
Mobile Platforms	Android 10
	iOS 13 and above
Languages Supported	English

- Coding Practices: All software code and scripts produced by the Digital Partner must follow JICA DXLab's coding standards. The Digital Partner is expected to show case coding best practices and periodically review with JICA DXLab. JICA DXLab team will do the code review as part of the sprints and the Digital Partner is expected to support during the review process. Some of these would include (but not be limited to):
  - Dev IDE plugins to static code checks and integrating with central server such as SonarQube
  - Git flow/trunk-based model for code branching
  - 90-95% unit test coverage for new code changes that are coming in
  - Functional and regression testing
  - Smoke and sanity automated testing
  - Code review and merging strategy
  - Standard code linters and static checks
  - Quality gates defined with following variables (NOTE: the grading is provided by tools like Sonarqube as industry standard):
    - Code smells - A
    - Duplicate code - <3%
    - Maintainability and reliability of code - A
    - Security – A
    - Unit Test coverage >80%
  - All code to have standardized logging practices automated using common libraries.
- Localization: Data to be localized with regional storage (India) on the corresponding cloud services used.

### 3.3. Web Portal cum Marketplace

#### (1) Scope for Web Portal cum Marketplace

- Detailed definition of features and corresponding tech specifications based on the information provided in this document
- Preparation of user journeys for different features
- Definition of workflows for different features
- Development of wireframes for front-end and back-end portal
- Development of Front-end web portal (features listed below)
- Development of Backend web portal (features listed below)
- Development of necessary backend services required to enable features for Front-end and Backend Portal
- Managing the handshake between front-end portal, Backend portal and backend services

#### (2) Type of users

- Transport Stack Users: These are users from businesses, startups, app developers, academia, think-tanks and any other institutions who will subscribe to the data / services offered on Transport Stack via Front End Portal
- Admin: These are designated users from Transport Stack working team or nominated 3<sup>rd</sup> parties to manage certain services via Back End Portal
- Super Admin: These are users who would have access to all the backend services and would be responsible creating accounts for Admin
- Data / Service approver: These are the data owners who would approve user requests for restricted datasets

#### (3) Front-end Portal

For Transport Stack users to discover the service listing, and access subscribed / authorized services. It should have following features:

- User registration
- User sign-in with 2-Factor Authentication and SSO
- User sign-out
- Account management showcasing user profile / details and the services subscribed by the users, along with the ability to modify certain information and change password
- Listing of datasets / services with provisions to -
  - Search the datasets / services using text-based search
  - Filter based on service category (such as core transport, ancillary services), transport mode or any other as suitable
- Service access request via a form, to subscribe to the datasets
- Payment mechanism for subscription of paid services
- Query system via submission of form on the web portal
- Download data catalogues and documents listed on the web portal
- Multichannel access for web portal from desktop, mobile etc.
- Web pages for Transport Stack Web Portal covering the aspects shown in the Table 4

**Table 4: List of Web Pages**

Category	Sub-Category
Home	Name and Tagline Scrolls of Blogs/ News Social media handle Links
About	Introduction of Transport Stack Vision, Mission & Values Benefits of Transport Stack to the ecosystem Our journey Governance Committee Advisory Panel
Data and Services	Listing of Data Sets Listing of Services
Resources	Learn About Transport Stack Different roles in the ecosystem Joining Instructions User guides Governance & Policies Publications- Articles / Whitepapers / Playbook Marketing Resources Tech Resources
Media	News Press Release
Help & Support	Contact Us FAQs Feedback

#### (4) Backend Portal

For service listing / modifications and access management by admin users

- User Management
  - List of registered / authorized users
  - Add / Delete / Modify user details
  - Data / Service Access Management
- Data / Service Listing Manager

- List of datasets and services
- Form to add datasets and services to the listing on front-end portal
- Ability to add and modify search tags that enable easy discovery of data and services
- Data / Service Request Management
  - Auto-approval of certain datasets / services based on information provided in access form
  - User based approval mechanism for certain restricted datasets / services
- Document Management
  - To upload new documents or delete existing documents available to end users (accessible via front-end portal)

### 3.4. Implementation of Use Cases

- Multiple use cases for the Transport Stack that may be implemented in a phased manner are identified in the Table 5 as an indicative list.
- The use cases described in the following sections are prioritized ones to be implemented during the Initial Term and an early stage of the Subsequent Term, and are thus detailed out from the scope perspective, further detailing and addition of new use cases for subsequent phases to be undertaken basis discussion with various stakeholders

**Table 5: List of Use Cases**

Initial Term (until June 2025)	Subsequent Term (from August 2025 beyond)
<p><b>E2E Journey Planning</b> (Feature list: Route options based on fare/time and Minimizing Inter-Modal Change Based Routes, Station / stop facility details, Accessibility friendly routes, Saving favorite/frequent routes, Emergency SOS Button, Disruption Alerts, Current Metro / Bus Occupancy, AI Chatbot for Query Resolution) Wave 1: BMRCL, BMTC, 1 aggregator player/ MaaS player</p>	<p><b>E2E Journey Planning</b> (Tentative list of additional features to be incorporated viz. options for access to EV charging stations, Group ticketing or bulk travel discount options for families or coworkers. Final list of features to be aligned later basis PTO discussions)</p> <p>Wave 2: + K-ride and other aggregator players, extension of use case to business players for beat planning, delivery movement etc. Wave 3: + Ongoing addition of transport mode operators as identified and agreed</p>
<p><b>Integrated Ticketing:</b> Wave 1: BMRCL, BMTC, 1 aggregator player/ MaaS player</p>	<p><b>Integrated Ticketing</b> Wave 2: + K-ride, integration with state level transit program Wave 3: + Coverage of other PTOs Wave 4: + Addition of other transport operators identified and agreed</p>
<p><b>Feeder Network Analysis and Integration of Feeder Bus Service:</b> Wave 1: Minimum 1 public and 1 aggregator player/ MaaS player</p>	<p><b>Integration of Feeder Bus Service/ B2B charter service:</b> Wave 2: Asset allocation and network planning for feeder buses &amp; expansion to other feeder bus operators/ aggregator players/ B2B charter service players</p>
<p><b>Micro-mobility Service Discovery and Booking</b> Wave 1: Onboarding of 1 Aggregator player</p>	<p><b>Micro-mobility Service Discovery and Booking</b> Wave 2: Onboarding next set of leading players</p>
<p><b>Metro Integrated Freight Delivery</b> Wave 1: Onboarding of 1 freight delivery player</p>	<p><b>Metro Integrated Freight Delivery</b> Wave 2: Onboarding next set of leading players</p>
<p><b>Bus Operations Analytics and Dashboard</b> Wave 1: BMTC Buses. Core KPIs on Operational performance and</p>	<p><b>Bus Operations Analytics and Dashboard</b> Wave 2: All bus operators. More KPIs related to Asset Management / Vehicle Health Analysis, Inventory management, Depo Performance Management</p>

Initial Term (until June 2025)	Subsequent Term (from August 2025 beyond)
passenger insights for feeder services including Depo Performance Management	
<b>Loyalty program for multimodal journey</b> Wave 1: BMRCL, BMTc	<b>Loyalty program for multimodal journey</b> Wave 2: + K-ride Wave 3: + Coverage of other PTOs Wave 4: + Addition of other transport operators identified and agreed
<b>Park &amp; ride</b> Wave 1: Onboarding of 1 parking service player	<b>Park &amp; ride</b> Wave 2: Onboarding of next set of leading players
N.A.  <i>The use cases shown in the right column in the Subsequent Term are indicative and subject to change based on the progress of the Transport Stack deployment and adoption.</i>	<p><b>Disruption Management</b> Wave 1: Transport Mode Service Status and Alternate Route; Recommendations for Metro Wave 2: Dynamic planning of alternate modes during disruptions for demand management</p> <p><b>Promoting non-farebox services</b> with digital listing of services and location-based notifications for deals and offers: Platform creation and onboarding of PTO partners</p> <p><b>Last Mile Analytics and Dashboard</b> Wave 1: Area boundary adherence / Geofencing (for taxi, auto), Overspeed Analysis (for taxi, auto) Wave 2: Identification of areas that require first/last mile service deployment for increased adoption of public transport</p> <p><b>Multimodal Journey Support</b> Wave 1: Chatbot for frequently asked questions by commuters on multimodal journey Wave 2: Complaints Management System for multiple transport modes booking</p> <p><b>Luggage drop &amp; go for travelers and locker facilities for courier companies</b></p> <p><b>Consolidated road health monitoring basis traffic trends, on-ground surveys</b></p> <p><b>Insights from Intelligent Traffic Management System</b> Traffic violations, Accidents</p>

### 3.4.1. End to End Journey Planning

A journey planner / trip planner / route planner is a specialized search engine used to find an optimal means of travelling between two or more given locations, sometimes using more than one transport mode. It enables commuters to plan their journey seamlessly using multiple modes of transport with routes options considering time, cost and number of interchanges.

#### (1) Coverage

- Train / Metro: BMRCL, K-Ride
- Bus: BMTc, KSRTC (urban)
- Micro-Mobility: Auto, Car Taxi, Bike Taxi, Aggregators

#### (2) Enablement on Transport Stack

- Ingestion of static data from different modes
- Integration with relevant systems for different modes to get static and real time data

- Creation of data models as per GTFS or any other recognized data standard relevant to different transport modes / datasets
- Translation of source data to GTFS or any other recognized data standard
- Creation of journey planning algorithm to provide route recommendations -
  - Route recommendations should include all the possible combinations of Metro, Bus, Rapid Rail, Micro-Mobility (E-Rickshaw, Auto, Car Taxi, Bike Taxi, Aggregators) and Walking basis the availability of different transport modes between the origin and destination
  - A route should include information on transport modes and corresponding start-end points, interchanges, travel time and cost
- Development of Multi-modal Journey Planner with different variants suitable to host on Transport Stack for increased adoption by app developers. For example -
  - Journey Planner for usage of Public Transport (Metro, Bus, K-Ride) – which can be leveraged by the apps that may not have integrations for micro-mobility in place
  - Journey Planner for End-to-End planning with the considerations for usage of Micro-Mobility
- Multi-modal journey planner should address following considerations:
  - It should be scalable in nature to include different operators for a particular transport mode
  - It should be replicable in nature, and should provide suitable route recommendations even if that particular transport mode is not available in any city / area
- Development of APIs so that App developers can subscribe to Multi-modal Journey Planner

### (3) Testing with MaaS apps

- Deployment of Multimodal Journey Planner for Public Transport on Metro / bus apps and other last mile mobility service providers
- Deployment of Multimodal Journey Planner (with Micro-Mobility) on Metro / bus apps and other last mile mobility service providers
- Closed group testing to check the app functionality and data accuracy
- Deployment on production and public release (subject to approval from relevant authorities)
- Provide reports on adoption / usage of journey planner

## 3.4.2. Integrated Ticketing

### (1) Coverage

- Train: BMRCL, K-Ride
- Bus: BMTC, KSRTC (urban)
- Micro-Mobility Services: Auto, Car Taxi, Taxi aggregators

### (2) Enablement on Transport Stack

- Integration with Metro AFC system to offer direct booking of Metro Tickets
- Integration with Bus AFC system (if available) or Leverage Open Ticketing Platform to offer direct booking of Bus Tickets
- Integration with Rail AFC system for direct booking of Rapid Rail Tickets
- Development of Integrated Ticketing Algorithm which can offer integrated ticket for multiple modes by leveraging the direct bookings of Metro, Bus and Rapid Rail, and Micro-mobility Service
- Development of APIs so that App developers can subscribe to Multi-modal Journey Planner
- Compatibility with NCMC Card or any other state level transit program

### (3) Testing with MaaS apps

- Metro / bus apps and other last mile mobility service providers may be used for testing purpose
- Development of necessary features for integrated ticketing including multimodal pricing summary, booking (including payments), cancellation for overall or individual leg, showcasing booked / completed / cancelled / on-going bookings and live tracking where applicable
- Transaction history page to include details on tickets booked for the user

- Closed group testing to check the app functionality and data accuracy
- Deployment on production and public release
- Provide reports on adoption / usage of micro-mobility services

### 3.4.3. Feeder Network Analysis and Integration of Feeder Bus Service

#### (1) Coverage

- MaaS and Public transport/ MaaS players

#### (2) Feeder Network Analysis –

- Identify gaps (whitespaces) in the existing metro and public bus transportation network
- Analyze commuter traffic flows to pinpoint high-demand areas and movement corridors
- Assess catchment demographics, including (but not limited) residential clusters, commercial zones, business hubs, and educational institution
- Determine optimal feeder routes for business organizations based on identified gaps and catchment insights

#### (3) Integration of Feeder Bus Service–

- Seamless integration with existing metro routes to ensure end-to-end connectivity
- Design and implementation of an integrated ticketing algorithm for unified fare systems across modes

### 3.4.4. Micro-mobility Service Discovery and Booking

#### (1) Coverage

- Aggregators / micro-mobility services

#### (2) Enablement on Transport Stack

- Open APIs for discovery and booking of micro-mobility services integration option for all the micro-mobility service providers that are directly integrated on the transport stack.
- This service will include all the necessary utilities (search, select, book, validate, cancel) related to micro-mobility services.
- The product will enable supply planning and smart nudge functionality for micro-mobility services.

### 3.4.5. Metro Integrated Freight Delivery

#### (1) Coverage

- Metro: BMRCL
- Logistics Providers: Leading logistics service providers

#### (2) Enablement on Transport Stack

- Freight Management Platform: Development of a centralized system to track cargo, manage routes, and handle scheduling and cargo reservations within metro systems.
- Capacity Optimization: Dynamic scheduling and slot allocation during non-peak hours to maximize metro train cargo capacity, ensuring minimal disruption to passenger services.
- Cargo Tracking & Visibility: Real-time tracking of shipments, with seamless integration of metro systems for continuous updates and delivery monitoring.
- Payment & Billing Integration: Automated invoicing and billing systems for smooth transactions, including dynamic pricing based on cargo type, weight, and delivery speed.

#### (3) Testing with Freight Apps and Metro Systems

- Integration Testing: Ensuring seamless coordination between metro services, third-party logistics, and freight apps for efficient cargo movement across multiple modes.

- Cargo Tracking & Scheduling Validation: Verifying accurate cargo updates, efficient load/unload times, and synchronization with metro schedules to ensure timely deliveries.
- Performance Monitoring: Real-time reports on cargo utilization, delivery efficiency, and environmental impact to assess system performance and make improvements.

### 3.4.6. Bus Operations Analytics and Dashboard

Business intelligence to monitor and manage public bus operations in Bengaluru and track operator's performance vs SLA.

- Define the exact KPIs with detailed description and mapping to different datasets required
- Discuss with different source system owners / operators to define data exchange format, frequency, exchange mechanism etc.
- Preparation of data model and integration with different source systems
- Analyze the historical and live data to determine data quality issues (missing traces, delayed communication etc.) and suggest ways to address the quality issues where possible
- Development of business services required for KPIs mentioned in Table 6
- Preparation of Dashboard wireframe
- Creation of suitable dashboard to provide summary of bus operations and executive insights for decision making
  - KPIs view on daily, monthly and yearly basis
  - Showcase insights for SLA monitoring and decision making as showcased in Table 7
  - MoM, YoY comparisons of KPIs
  - Data breakdown / cuts by assets type, depo, cluster and operator level
  - AI/ML layer on top to get specific insights using the data
- Create provisions to download the data and monthly/yearly reports
- Closed group testing to check the app functionality and data accuracy
- Linkage with Bus Ops Dashboard to Web Portal
  - Linkage to different dashboards available as part of use case related for Bus Ops Analytics
  - Account based access to specific dashboards
  - Listing discoverable only to authorized users

**Table 6: KPIs for Bus Dashboard<sup>1</sup>**

Category	KPI / Metric (Indicative list)
Operational performance	<b>Fleet utilization</b>
	Active fleet vs Total fleet
	Utilization %
	Downtime per bus
	<b>Schedule adherence</b>
	On-time arrival rate
	Avg delay per trip
	Depot in / Depot out
	<b>Network planning &amp; performance</b>
	Trips per route per day
	Avg trip duration per route
	Route deviation events

<sup>1</sup> List of KPIs mentioned in the table are indicative; Bidder is expected to suggest KPIs with definition based on best practices

	<b>Fare collection – move to AFC Ops</b>
	Total revenue per route / day
	Avg fare per passenger
	Revenue per km
	Ticket type distribution (single / pass / digital / cash)
	<b>Dynamic metrics</b>
	Live tracking of buses
	Live bus wise occupancy
<b>Passenger insights</b>	<b>Ridership metrics</b>
	Daily/Weekly/Monthly Passenger Count
	Passengers per Bus per Hour
	Peak hour ridership
	Passenger load factor (passengers vs capacity)
	Ridership by line
<b>Vehicle health &amp; maintenance</b>	<b>Maintenance metrics</b>
	Unscheduled maintenance events
	Avg maintenance time
	Maintenance cost per bus
	<b>Fuel efficiency</b>
	Fuel consumption per 100 kms
Cost per km	
<b>Safety &amp; compliance</b>	<b>Incident tracking</b>
	Accidents / safety events per route
	Speeding events
	<b>Regulatory compliance</b>
	License / Permit expiry tracking
	Driver certification status

**Table 7: Indicative List of Insights**

KPI	Analytical Insight	Description
<b>Utilization %</b>	Depot-wise / Route-wise Analysis	Identify how efficiently each bus or depot utilizes available vehicles over time.
<b>Downtime per bus</b>	Maintenance Correlation	Track and reduce average downtime per bus by correlating with maintenance events.
<b>On-time arrival rate</b>	Time-of-Day / Route-Based Trends	Analyze punctuality trends by time or route to improve reliability.
<b>Route deviation events</b>	GPS Tracking / Deviation Trends	Use telematics to monitor deviations from predefined routes and investigate reasons.
<b>Passengers per Bus per Hour</b>	Load Analysis	Measure bus usage efficiency and identify over- or under-utilized routes.
<b>Peak hour ridership</b>	Time-Slot Optimization	Identify high-demand periods and align bus frequency accordingly.

<b>Revenue per km</b>	Route-Specific Analysis	Identify high/low earning routes and correlate with efficiency and ridership.
<b>Ticket type distribution</b>	Fare Method Trend Analysis	Track changes in fare payment methods to support digital adoption or streamline cash handling.
<b>Unscheduled maintenance events</b>	Reliability Analysis	Monitor frequency of unexpected breakdowns to improve maintenance planning.
<b>Avg maintenance time</b>	Service Disruption Analysis	Evaluate impact of maintenance downtime on fleet availability.
<b>Maintenance cost per bus</b>	Cost Control Analysis	Identify high-cost vehicles or maintenance inefficiencies.
<b>Fuel consumption per 100 kms</b>	Fuel Efficiency Monitoring	Track and reduce fuel or energy usage by vehicle or route.
<b>Accidents/safety events per route</b>	Safety Hotspot Analysis	Identify and mitigate high-risk locations by monitoring incidents.
<b>Speeding events</b>	Driver Behavior Insights	Detect speeding trends and improve driver safety training.
<b>License / Permit expiry tracking</b>	Compliance Monitoring	Ensure legal and operational compliance by tracking due renewals.
<b>Driver certification status</b>	Workforce Readiness Check	Monitor driver qualifications and plan training to maintain safety standards.

### 3.4.7. Loyalty Program for Multi-Modal journey

#### (1) Coverage

- Metro/ Rail: BMRCL, K-Ride
- Bus: BMTCL, KSRTC (urban)
- Micro-Mobility: Auto, taxi services, aggregators

#### (2) Enablement on Transport Stack

- Development of a loyalty engine to track user journeys across all integrated modes and parking facilities
- Definition and configuration of point accrual rules based on travel distance, frequency, fare amount, or specific promotions
- Implementation of reward catalog and redemption mechanisms (e.g., free rides, discounts, partner benefits)
- Management of user loyalty tiers with tier-based incentives
- APIs for real-time point balance inquiry, reward redemption, and transaction history
- Enablement of campaigns for special occasions, off-peak travel, first-time users, etc.
- Option to integrate external loyalty programs (e.g., airline miles, credit card rewards)

#### (3) Testing with MaaS apps

- Development of loyalty features within MaaS apps including points dashboard, reward store, and redemption history
- Testing accrual of points for different journey combinations (single mode and multi-modal)
- Validation of tier upgrade/downgrade logic based on user activity
- Closed group testing to verify points calculation, redemption workflows, and promotional campaigns
- Transaction history page to show earned, redeemed, and expiring points
- Reports on program participation, user engagement levels, and reward redemption patterns

### 3.4.8. Park & Ride Solution

#### (1) Coverage

- Metro/ Rail: BMRCL, K-Ride
- Bus: BMTCL, KSRTC (urban)
- Authorized parking operators near key transit hubs, parking service players

#### (2) Enablement on Transport Stack

- Integration with parking management systems to display real-time availability of parking spaces near transit hubs
- Development of booking APIs for parking slots with configurable time windows and dynamic pricing models
- Bundling of parking booking with corresponding public transport ticket (Metro, Rail, Bus) to enable single journey booking experience
- Unified payment gateway integration to allow combined payment for parking and transit (via integrated ticketing)
- Implementation of cancellation, modification, and refund logic for parking and transit bookings
- Enablement of Parking Loyalty or Discounts for frequent users or season pass holders (optional)

#### (3) Testing with MaaS apps

- Testing integration with Metro, Bus apps, and MaaS platforms for seamless Park & Ride journey planning, booking, and payment
- Development of user flows for parking discovery, reservation, payment, cancellation, and access through apps
- Creation of journey receipts detailing parking and public transport bookings
- Closed group testing to validate booking, access, and payment workflows
- Transaction history to reflect combined and individual booking details (parking + transit)
- Reports on parking space occupancy, bookings, and user adoption

### 3.4.9. Additional use cases

In addition to the four use cases shown above, JICA and the Digital Partner will consult and may decide to implement some additional use cases in the Subsequent Term. An indicative list of the potential use cases are shown in the Table 5 above.

### 3.5. Support Required from Digital Partner for Overall Implementation

As the main custodian of Transport Stack Cloud Platform, the Digital Partner is expected to provide the following support to app / solution developers on top of the Transport Stack for testing of use cases –

- Share knowledge on system architecture and tech specifications of the Transport Stack for considerations
- Ensure the access to different datasets integrated and managed on Transport Stack, by creation of necessary data pipelines and APIs
  - If some use cases would be implemented by other parties
  - Ensure the availability of necessary cloud infrastructure
  - Creation of development and test environments
  - Obtain knowledge transfer and handover from JICA and the JICA appointed consultant once the development, testing and deployment is completed, for ongoing monitoring and maintenance of these items as part of overall Transport Stack

#### 4. Implementation Timeline

**Table 6.1: Implementation Timeline for deliverables until end of June 2025**

Sr. No	Deliverable	Details	Timeline
1	Integration of datasets	1. Integration of relevant datasets to enable the following use cases E2E journey planner, feeder network analysis and integration of feeder bus service, micro mobility service discovery, bus operations analytics dashboard, (and features) defined in Table 5 under first phase	T + 4 weeks
2	Algorithm ready for execution	1. Algorithm build for delivering use cases (and features) defined in Table 5 under first phase 2. Algorithm ready for execution (tested and successfully running) for the use cases (and features) defined in Table 5 under first phase	T + 4 weeks
3	Integration with MaaS player	1. Integration and testing with MaaS player	T + 6 weeks
4	Integrated ticketing, Loyalty program and Park & Ride	1. Integrated ticket issuance (as defined in table 5) 2. Loyalty Program for multimodal transport 3. Park & Ride service	T + 6 weeks
5	Metro integrated freight delivery service	1. Integration with freight delivery providers to enable deliveries through Metro	T + 6 weeks
6	API Documentation	1. API documentation for changes to re-usable component 2. API documentation for new modules developed	T + 6 weeks

Timeline is indicated as T + x where x is weeks

**Table 6.2: Implementation Timeline for deliverables from July 2025 to March 2026**

Sr. No	Deliverable	Details	Timeline
1	Additional data sets to be integrated	Additional features to be incorporated (tentative list mentioned in Table 5, to be confirmed basis discussion with PTOs)	Sep 2025
		<b>Timeline for data sets as defined in different Waves for existing use cases as in Table 5</b>	
		Wave 2	Sep 2025
		Wave 3	Dec 2025
		Wave 4	Mar 2026
2	Additional use cases	<b>Disruption Management</b>	
		Wave 1: Transport Mode Service Status and Alternate Route; Recommendations for Metro	Sep 2025
		Wave 2: Dynamic planning of alternate modes during disruptions for demand management	Dec 2025
		<b>Promoting non-farebox services</b> with digital listing of services and location-based notifications for deals and offers: Platform creation and onboarding of BMRCL partners	Mar 2026
		<b>Last Mile Analytics and Dashboard</b>	
Wave 1: Area boundary adherence / Geofencing (for taxi, auto), Overspeed Analysis (for taxi, auto)	Sep 2025		

		Wave 2: Identification of areas that require first/last mile service deployment for increased adoption of public transport	Dec 2025
		<b>Multimodal Journey Support</b>	
		Wave 1: Chatbot for frequently asked questions by commuters on multimodal journey	Sep 2025
		Wave 2: Complaints Management System for multiple transport modes booking	Dec 2025
		<b>Insights from Intelligent Traffic Management System</b> Traffic violations, Accidents	Mar 2026
		<b>Luggage drop &amp; go for travelers and locker facilities for courier companies</b>	Dec 2025
		<b>Consolidated road health monitoring basis traffic trends, on-ground surveys</b>	Dec 2025

## 5. Deliverables

The list of deliverables to be submitted for the proposed scope is as follows:

- (1) Business Requirement Document basis the proposed scope
- (2) Technical Specification Document for the designed solution
- (3) Entity Relationship Diagram for Data Models
- (4) System Architecture
- (5) Details of cloud services and their specifications
- (6) List of third-party services, their specifications and license model
- (7) Infrastructure specifications for different environments
- (8) Mock screens / Wireframes for dashboard / MaaS apps
- (9) Flow chart for algorithms
- (10) Integration documentation
- (11) API specifications
- (12) Changes to re-usable modules back to transport stack repository
- (13) Swagger Docs (including for changes to re-usable components)
- (14) CI/CD Setup Details
- (15) Code Repository
- (16) Code Library
- (17) Functional Release Notes
- (18) System Performance Report
- (19) API Performance Test Reports

## 6. Items to be included in Proposal

- (1) Proposed solution, approach and timeline
  - Clear indication on what all items from the scope that can be done at your end & what all items to be covered by outsourcing of 3<sup>rd</sup> parties
  - Specify dependencies and any support required to deliver the proposed scope
- (2) Proposed team structure, size and roles / capabilities
- (3) Professional fee, with breakdown for item below
  - Transport Stack Cloud Platform Setup
  - Web Portal Cum Marketplace
  - Use cases for Implementation – breakdown by each use case

- (4) Rate card for different roles / level proposed for estimation of additional scope that may be included in future
- (5) Relevant credentials

## 7. Hypercare Requirements

- The proposal to include provision and plan for hypercare support post-production roll out for 30 days
- Approach for transferring from Dev Team to Operations Team post hypercare
- Duration and plan for hand-holding during the transfer

### 7.1. Support Requirements

#### 7.1.1. Infrastructure & Operations support

- Dedicated support to manage DevOps infrastructure and platform not restricted to central platform but also integration with 3rd parties
- Infrastructure monitoring to provide proactive alerts on anomalies in infrastructure and 3rd party API integrations

#### 7.1.2. DevOps Support

- Monday through Friday -9 AM- 6 PM.
- On call support between 6:00 pm-09:00 am for P1 tickets only
- Regular maintenance of DevOps build pipeline

#### 7.1.3. Proactive Monitoring – Platform & Cloud Infrastructure

- Shall monitor the health of the Infrastructure and proactively identify issues that may impact performance.
- All monitored items are assigned two alert levels, based on specific thresholds. When the first threshold is breached, 'Warning' notifications shall be triggered. When the second set of thresholds are breached, 'Failed' notifications shall be triggered.
- Shall proactively seek to remediate any issues before Failure
- Remediation shall be managed using Change control process.
- Provide centralized support to triage defects from end customer / MDP users based on severity and provide first response.
- SLA For DevOps and Support is shown in Table 8.

**Table 8: SLA for DevOps and Support**

Severity	Description	Reaction time	Resolution time	Frequency of Update	RCA time
P1 Critical	<b>Extremely Critical</b> – Preventing multiple customers from performing tasks critical to the normal operation of application	15 business minutes	45 business minutes	Every 15 minutes	4 business hours
P2 High	<b>Significant</b> – Preventing customer from performing tasks essential to the normal operation of application	1 business hours	3 business hours	Every 60 minutes	8 business hours
P3 Medium	<b>Moderate</b> – One of the functions is disrupted or	8 business hours	24 business hours	Every 4 hours	24

	impaired, with little or no impact on application				business hours
P4 Low	<b>Negligible</b> – Incident of a non-critical nature	8 business hours	40 business hours	Every day	40 business hours

- SLA requirements for the support to be provided between 9AM to 9PM (6 Days a week):

Severity Level	First Response Time	Work Around Time	Permanent Fix Time
Severity 1	15 Mins	2 Hours	24 Hours
Severity 2	30 mins	4 Hours	48 Hours
Severity 3	2 Hours	8 Hours	96 Hours
Severity 4	3 Hours	16 Hours	120 Hours

## 7.2. Backup Management

The proposal shall provide integrated backup solution which protects the Transport Stack’s business critical data. Managed backup shall include following, aligning with prescribed Backup Policy:

- Backup of entire Virtual Machines, all supported applications, database, file system etc.
- Backup status monitoring
- Email alerts & notification for backup completion & backup failure
- Restore of specific data and machines upon request
- Weekly backup reporting
- Remediation of issues preventing the installation or performance of managed backup
- All back-up data shall be retained as per prescribed backup policy

## 8. Liquidated Damages

- The Liquidated Damages are recovered from the Digital Partner for delay and not as penalty.
- The amount of Liquidated Damages leviable under the Contract shall be the genuine pre-estimate of the loss suffered because of which the Liquidated Damages have been levied on the Digital Partner. The Liquidated Damages may be recovered from any amount of money due to the Digital Partner.
- For every week of delay beyond the Contract end date the Digital Partner will be liable to pay 1% of Contract value per week subject to maximum ceiling of 10% of Contract value. The following conditions apply:
  - Mitigating Circumstances: If the delay is caused by factors beyond the control of the Digital Partner, such as force majeure events or delays attributable to JICA, the penalty shall not apply.
  - Notice of Delay: The Digital Partner shall notify JICA in writing as soon as a delay is anticipated, providing reasons for the delay and a revised timeline for completion.
  - Efforts to Mitigate: Both parties shall make reasonable efforts to mitigate the impact of the delay and work collaboratively to achieve project completion.

(END)

## Appendix: Rate Card

<to be provided by Bidder; roles mentioned in the table are indicative and Bidder should fill the role suitable for the organizational structure>

<b>Roles</b>	<b>Rates per hour (in USD)</b>
Project Director	
Project Manager	
Scrum Master	
Ops Lead	
Engineering Manager	
Technology Manager	
Sr. Software Architect	
Sr. Business Analyst	
Business Analyst	
Sr. Flutter Developer	
Sr. Java Developer	
Java Developer	
Sr. Data Engineer	
Data Engineer	
Sr. DevOps Engineer	
DevOps Engineer	
Sr. QA Engineer / Tester	
QA Engineer / Tester	
UX Designer	

## Attachment 1 - Proposal submission formats

### Table of Contents

Section	Description
<b>Form 1.0</b> Executive Summary	Summary of the proposal
<b>Form 1.1</b> Company Overview	Information about the bidding company
<b>Form 1.2</b> Proposed Team Construct	Team structure and roles for Contract delivery
<b>Form 1.3</b> Expertise & Experience for team members	Details on relevant development experience
<b>Form 1.4</b> Proposed Architecture & Tech stack	System architecture (i.e.; technology, infra & integration) along with proposed tech stack, rationale behind the choices made, references of the case studies/ project executed by Bidder in past
<b>Form 1.5</b> Workplan & Delivery Approach	Implementation approach, structure & composition of the team, details of capacity building
<b>Form 1.6</b> Client Reference Format	Information about the past projects
<b>Form 1.7</b> Commercial Proposal	Financial bid, structure, and rate cards
<b>Form 1.8</b> Commercial Bid for build, license and support & maintenance 1st July 2025 onwards	Financial bid, structure, and rate cards for support and maintenance roles, Service description etc.

## Form 1.0 Executive Summary

Category	Description
Executive Summary	<ol style="list-style-type: none"> <li>1. The executive summary covers a brief note of the partner's response for an executive-level audience.</li> <li>2. The partner is expected to specifically cover how it is uniquely positioned to achieve stated objectives of this RFP.</li> </ol>
Relevant Expertise and Experience	<ol style="list-style-type: none"> <li>1. Relevant Indian/Global experience</li> <li>2. Experience in urban mobility sector including bus / metro operators (platform implementation for mobility/ multi- modal transportation will be preferred);</li> <li>3. Experience in full stack implementation projects with AMS &amp; RunOps irrespective of geography/sector</li> <li>4. Relevant Partnerships with a CSP of Choice</li> <li>5. Relevant case studies / experience in specific functional areas</li> <li>6. For each of the experience areas – partners to provide experience/ credentials reflecting the following capabilities</li> <li>7. Role played by partner in delivery</li> <li>8. Marquee 3rd party tools/solutions/ libraries implemented as part of delivery</li> </ol> <p>Client reference contact for reference case studies</p>
Delivery Approach	<p>Delineate your 'Delivery approach' specifying your approach to meeting the points mentioned below</p> <ol style="list-style-type: none"> <li>1. A brief note on your prescription for following Scrum (Agile) based Software Delivery.</li> <li>2. Entry &amp; Exit Criterion definitions</li> <li>3. Entry criterion will adhere to the Definition of Ready ('DoR') agreed upon with Bengaluru Transport Stack team</li> <li>4. Exit criterion will adhere to the Definition of Done ('DoD') agreed upon with Bengaluru Transport Stack team</li> <li>5. Testing Excellence</li> <li>6. Test driven development (TDD) approach</li> <li>7. Unit Code coverage checks (adhere to norms approved at the start (e.g. &gt; 85%))</li> <li>8. Integration Testing</li> <li>9. Regression Testing</li> <li>10. Tools that partner proposes to meet requirements. Tools include but not limited to             <ol style="list-style-type: none"> <li>a. Code Quality Tools</li> <li>b. DevSecOps tools</li> <li>c. Static and Dynamic code analysis and Container vulnerabilities                 <ol style="list-style-type: none"> <li>i. SAST and DAST analysis</li> <li>ii. Security tools and procedures including data security</li> </ol> </li> </ol> </li> </ol> <p>IT Operations / Application Performance Management (APM) / Observability tools</p>
Hypercare Support	Provision and Plan for Hypercare support post production roll out
Transfer To Operations (TTO)	<ol style="list-style-type: none"> <li>1. Partner's approach to transferring from Dev Team to Operations Team post hypercare</li> <li>2. Duration and Plan for hand-holding during the transfer</li> </ol>
Presentation of proposal to Evaluation Committee	Presentation of proposal by the partner to Evaluation Committee covering salient aspects of the partner's implementation approach.

## Form 1.1a Company Overview

S No	Particulars	Details
1	Name of the Bidder	
2	Corporate Identity No (in registered country allocated by respective govt.)	
3	Place of Registration/Principal Business	
4	Complete Postal Address	
5	Pin code/ZIP code	
6	Telephone no's (with country/area codes)	
7	Contact persons/Designation	
8	Email IDs of the contact person	
9	Mobile Nos (with country/area codes)	
10	Number of employees (split by technical staff and non-technical staff)	
11	Profits for FY 2024 (In USD)	
12	Profits for FY 2023 (In USD)	
13	Revenue for FY 2024 (In USD)	
14	Revenue for FY 2023 (In USD)	
15	Year of incorporation	
16	Documents to be attached	<p>Audited copies of the P&amp;L statement Or the Chartered Accountant certificate for minimum of last 2 years.</p> <p>Copy of Certificate of incorporation / partnership/ any other government recognized certificate mentioning dates.</p> <p>Self-certified letter from CEO/ authorized body for Number of employees, and Local workforce</p> <p>Signed and stamped No-deviation certificate</p>

### Form 1.1b Company Overview - Taxation

S No	Particular	Details
1	Identification no. assigned by tax authority in country of registration	
2	Category of Tax Registration as per applicable law authority in country of registration	
3	Registered/Certified Offices from where the Services would be supported and Place of Service Site for Tax	
4	Contact Names, Nos & email IDs for Tax matters (Please mention primary and secondary contacts)	

### Form 1.2 Proposed Team Construct

Sr No	Role	No. of People	Skillset	Years of Experience	Years of Experience with Mobility sector tech. enablement if any
1	Project Lead/ Manager				
2	Solution Architect				
3	Domain expert				
4	Delivery Manager				
5	Delivery Manager				
6	Technology Lead (Front end, back ends, Apps)				
7	Business Analyst/PO				
8	Sr. App Developer				
9	Jr. App Developer				
10	UI/UX Engineer				
11	QA Engineer				
12	IT Security				
13	Others (Specify)				

The list of roles is for experts and is non-exhaustive. Bidder to provide detailed few of all the resources planned for mobilization.

### Form 1.3 Experience & Expertise

- Information of the four experts who are subject to technical evaluation (Project Lead, System Architect, Domain Expert and Delivery Manager) will be given by with the particular information listed as follows.
- Attrition or replacement of any of the named experts on or after the date of Technical Presentation should be honored within two weeks. Resources must be replaced with a resource of equal or higher competence. The replacement of the resource shall be interviewed by evaluation team prior to the final hiring.

### Key Expert Curriculum Vitae form

Particulars		Details
Name		
Role in the project		
Educational Qualifications		
Total Years of experience		
Total Years of software development experience		
Tenure with the Digital Partner's organization / entity		
Base location		
Opportunity to interview		
Certifications		
Language proficiency – English		
Availability date		
List main relevant projects for the scope of this RFP, including project descriptions, starting/ending periods, designation & role played by the person in this project, client/industry, and key impact to business/tech performance (maximum 500 words each)	Project 1	
	Project 2	
	Project 3	

### Form 1.4: Proposed Architecture & Tech Stack for Delivery of SOW

- The proposed architecture encompasses key principles and design patterns for the front-end, back-end, integrations/APIs, infrastructure, and OEM software tools, ensuring a robust, scalable, and flexible solution.
- The front-end will prioritize responsiveness and an intuitive user experience, while the back end will utilize scalable and secure architectures.
- Integrations will follow API-first principles for seamless interoperability.
- The infrastructure will prioritize high availability and disaster recovery.
- OEM software tools will be selected for their compatibility and support, enhancing overall performance and reliability.

## Form 1.5 Work Plan and Delivery Approach

- Maximum 70 pages
- To be submitted as part of Technical Bid, along with supporting documents, if any on Bidder's Letterhead.
- Suggested structure: (1) Implementation approach; (2) Organization and staffing; and (3) Capacity building and training.

### (1) Implementation approach

{Explain your understanding of the objectives of the assignment, the agile methodology/ principles to be adopted along with implementation plan clearly delineating milestones & timelines with sprints for development, testing, rollout & support to customer & admin in terms of capability building & training}

### (2) Organization and Staffing

{Please describe the structure and composition of your team, including the list of the Key Experts, Non-Key Experts, and relevant technical and administrative support staff. Please provide details of projects executed in past, total years of experience in tech domain, certifications etc. }

### (3) Capacity building & training

{Please submit detailed strategies towards development of material (FAQs, videos etc.) for citizen/public user for App navigation, troubleshooting, chatbot etc. including content summaries, and references. Similarly outlay comprehensive training agendas to facilitate effective knowledge transfer and skill enhancement (admin)}

## Form 1.6 Client Reference Format

- Documentary evidence like Purchase Orders, Copies of the Service Contracts or work, completion certificates from the client confirming the details of the project executed to be submitted with following details.
- Each report should not be more than five pages long. (12 font size min).

Details
Name of the Client
Contact person of the Client with Name, Designation, Tel. No., Address, Email-id & Mobile no.
Title of the project
Location of the project
Documentary evidence submitted
Scope of the project
Role of the Bidder
Contract valid from / up to
No. of person-months
Size of the project (in USD equivalent)
No. of years of tie up
Project Details (SOW, Solution architecture, Implementation methodology, Integration, Data flow, software configurations & hardware used at the client end, team construct etc.)

**Form 1.7 Commercial Bid for Initial Phase (until June end)**

Sr. No	Description	Cost (USD) inclusive of all taxes
1	One Time development cost (Table #1)	
2	Software, tools & licenses cost (Table #2)	
	TOTAL COST OF IMPLEMENTATION	

**Table #1 – One Time development Cost**

Sr. No	Particulars	Number of Man- days (X)	Blended Man- day rate (Y)	One Time Development Cost (Z) = (X) * (Y)	Taxes (A)	Total Cost (USD) inclusive of all taxes (B) = (Z) + (A)

Note: Provide tentative estimate of resources by category of skill set & profession. Ex: Project Manager, Solution architect, Developers, etc.

**Table#2 – Software, tools & licenses cost**

Sr. No.	Software/ Tool	Version	Description	License type (Perpetual/ subscription/ User based)	Total cost	License Duration	Support & Maintenance Cost

Please include all relevant assumptions, terms, and conditions to facilitate JICA's understanding and consideration.

**Form 1.8 Commercial Bid for build, license and support & maintenance 1<sup>st</sup> July 2025 onwards**

Sr. No	Description	Cost (USD) inclusive of all taxes
1	One Time development cost (Table #1)	
2	Support and maintenance (Table #2.1 and #2.2)	
3	Software, tools & licenses cost (Table #3)	
	TOTAL COST OF IMPLEMENTATION	

**Table #1 – One Time development Cost**

Sr. No	Particulars	Number of Man- days (X)	Blended Man- day rate (Y)	One Time Development Cost (Z) = (X) * (Y)	Taxes (A)	Total Cost (USD) inclusive of all taxes (B) = (Z) + (A)

Note: Provide tentative estimate of resources by category of skill set & profession. Ex: Project Manager, Solution architect, Developers, etc.

**Table #2 - Support and maintenance**

**Table#2.1 Support and Maintenance Roles and Rates for App & web**

Sr. No	Professional Figure	Monthly Rates (USD) inclusive of all taxes
1	Project Manager	
2	App Developers	
3	Backend engineers	
4	Support Engineer	
5	Technical support staff	
6	QA Engineer	
7	Others (Specify)	

**Table#2.2 Breakdown of support & maintenance services**

Service type	Description	Response time	Any associated terms & conditions

**Table#3 – Software, tools & licenses cost**

Sr. No.	Software/ Tool	Version	Description	License type (Perpetual/ subscription/ User based)	Total cost	License Duration	Support & Maintenance Cost

Please include all relevant assumptions, terms, and conditions to facilitate JICA’s understanding and consideration.

**Attachment 2 Query Format**

**Name of the Bidder:**

Sr. No.	RFP Document Reference (Section & Page Number & Clause)	Brief Details/Query in reference to the clause

### **Form 1.10 Declaration by Digital Partner**

We have fully understood the terms and conditions outlined in the RFP Document and hereby accept and agree to comply with these terms and conditions without any reservations.

We also confirm the validity, truthfulness, and correctness of scanned copies of documents, affidavits, and undertakings uploaded during the shortlisting process and for this RFP, to the best of our knowledge and belief. We will bear responsibility for any disputes regarding the validity and truthfulness of such documents, affidavits, and undertakings, and commit to providing originals and self-certified copies of all such documents for scrutiny upon demand.

We further confirm that should our bid be accepted; we agree to adhere to all such terms and conditions in the resultant Contract. We undertake to treat this Bid/RFP and your written Letter of Award as a binding Contract between us until a formal Contract is signed or issued.

We hereby confirm that the information provided above is accurate and complete, with no concealment of facts, and commit to informing you of any future changes to these details. We understand that any misinterpretation or misrepresentation will be considered a violation of the Code of Integrity and may lead to legal actions against us.

We confirm that we are duly authorized to submit this Bid and to make commitments on behalf of the Bidder, recognizing that our digital or digitized signature is valid and legally binding, with supporting documents provided herewith.

#### **Rights of JICA to Reject Bid(s):**

We understand that JICA is not obligated to accept the lowest or any bid received in response to the aforementioned RFP Document.

(Signature with date)

(Name and designation, duly authorized to sign Bid for and on behalf of the Bidder)

(Name, address, and seal of Bidder]